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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,701	01/29/2001	Toru Tatsumi	NECW 18.281	3273

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EXAMINER	
TSAI, H JEY	

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No.	Applicant(s)	
	09/744,701	TATSUMI ET AL.	
	Examiner	Art Unit	
	H.Jey Tsai	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *47-56 and 118-121* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *47-56 and 118-121* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

Claim 50 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Because claim 47 includes nitrogen dioxide.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 47-49, 51-54 and 118-120 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Fujii et al. 5,006,363, cited by Applicants on March 11, 2005.

Fujii et al. discloses a method of forming a metal oxide layer the semiconductor substrate by a thermal CVD method, which includes:

introducing metal organic material ($Sr(DPM)_2$ and $Ti(OC_3H_7)_4$, inlets 28-29) and **oxidizing gas (oxygen, inlet 25, cylinder 10 at fig. 1**) into vacuum chamber through separate introduction inlets, see fig. 1, 2, col. 7, lines 10-30, col. 4, lines 30-35,

heating the substrate (180 ^{o}C) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than < $1X10^{-2}$ torr ($5.7X10^{-4}$ torr through out the period of the film deposition), col. 7, lines 10-30,

wherein the film formation is carried out by controlling the gas supply conditions for the
organometal gases and/or the oxidizing gas to be self-controlling gas supply conditions (introducing oxygen gas first then organometal gases with separate introduction inlets) as to obtain the metal oxide dielectric film having a prescribed composition and crystal structure (perovskite-type crystalline structure, col. 7, lines 32-42,

wherein the flow rates of organometal gases and the oxidizing gas are directly controlled
without using a carrier gas to introduce the organometal gases and the oxidizing gas into the vacuum chamber, col. 7, lines 7, lines 1-31,

wherein the metal oxide dielectric film is a PZT film or a BST film, col. 6, lines 11-15 and col. 9, lines 65-68,

wherein the substrate has capacitor electrodes formed thereon which comprises at least one of metals or metal oxides of Pt and the metal oxide dielectric film is formed on the substrate in vapor phase, col. 7, lines 25-42.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 50 and 55 stand rejected under 35 U.S.C 103 as being unpatentable over Fujii et al. as applied to claims 47-49, 51-54 and 118-120 above, and further in view of Eguchi et al. 5,618,761 and Moise et al. 6,211,035, both are previously applied.

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches using an oxidant of nitrogen dioxide, aluminum wiring and chamber wall temperature. However, Eguchi et al. teaches at that col. 3, lines 38+, col. 5, lines 45+, col. 6, lines 8+, col. 9, line 53+, col. 12, lines 50+ and col. 14, lines 30+, forming a PZT film with ABO_3 crystalline structure with organic metal gas source and nitrogen dioxide oxidant with reactive chamber pressure at 400 torr or less (col. 6, lines 58+) and a platinum bottom electrode. And, Moise et al. teaches at col. 6, lines 19+, forming aluminum metal wiring layer 348.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide film by using nitrogen dioxide as oxidant and forming aluminum wiring layer as taught by Eguchi and Moise because metal oxide can be used to form an non-volatile memory device and nitrogen dioxide is not as reactive as oxygen and using aluminum for interconnection with the semiconductor chip.

Claim 56 stand rejected under 35 U.S.C 103 as being unpatentable over Fujii et al. as applied to claims 47-49, 51-54 and 118-120 above, and further in view of Yunki et al. 5,776,254, previously applied

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches the temperature of chamber wall. However, Yunki et al.

teaches at col. 13, lines 17-27 and abstract, forming a metal oxide film with heated chamber wall. And, the specific temperature of chamber wall as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide film by heating the chamber wall with specific temperature as taught by Yunki et al. because metal oxide would formed on the substrate instead of chamber walls.

Claim 121 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. 5,006,363, cited by Applicants on March 11, 2005, in view of Yunki et al. 5,776,254, previously applied.

Fujii et al. discloses a vapor phase growth method of a metal oxide layer the semiconductor substrate by a thermal CVD method, which includes:

introduing metal organic material ($Sr(DPM)_2$ and $Ti(OC_3H_7)_4$, inlets 28-29) and oxidizing gas (oxygen, inlet 25) into vacuum chamber through separate introduction inlets, see fig. 2, col. 7, lines 10-30,

heating the substrate (180 ^{o}C) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than < $1X10^{-2}$ torr ($5.7X10^{-4}$ torr through out the period of the film deposition), col. 7, lines 10-30,

wherein the film formation is carried out by controlling the gas supply conditions for the

organometal gases and/or the oxidizing gas to be self-controlling gas supply conditions (introducing oxygen gas first then organometal gases with separate introduction inlets) as to obtain the metal oxide dielectric film having a prescribed composition and crystal structure (perovskite-type crystalline structure, col. 7, lines 32-42.

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches the temperature of chamber wall. However, Yunki et al. teaches at col. 13, lines 17-27 and abstract, forming a metal oxide film with heated chamber wall. And, the specific temperature of chamber wall as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide film by heating the chamber wall with specific temperature as taught by Yunki et al. because metal oxide would formed on the substrate instead of chamber walls.

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Conclusion

Applicant's arguments filed Nov. 29, 2005 have been fully considered but they are not persuasive. Because Fujii clearly teaches at col. col. 4, lines 30-35, using an **oxidizing gas (oxygen, cylinder 10, fig. 1**) into vacuum chamber through separate introduction inlets as set forth above. And, Fujii also clearly teaches introducing metal organic material ($Sr(DPM)_2$ and $Ti(OC_3H_7)_4$, inlets 28-29) and oxidizing gas (oxygen, inlet 25) into vacuum chamber through separate introduction inlets, heating the substrate (180 ^oC) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than < $1X10^{-2}$ torr ($5.7X10^{-4}$ torr through out the period of the film deposition), col. 7, lines 10-30.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-

1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for this Group is (703) 872-9306.

hjt

2/4/2006

H. Jey Tsai
Primary Examiner
Patent Examining Group 2800